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ABSTRACT

This paper addresses the problem of how school environments can be restructured to address the key requisites of cognitive development for all children. Following the problem statement, the second section discusses the historic concerns related to restructuring and the research underlying them--the roots of the cognitive revolution, the teaching-thinking movement, restructured learning environments, and the needs of at-risk students. Section 3 offers an indepth examination of how to build a restructured classroom environment, with a focus on its essential elements, curriculum, instruction, and assessment. Implications of this examination for at-risk students and their learning are discussed in the fourth section. The final section summarizes findings that demonstrate: (1) the importance of cognition for reform goals; (2) the need to provide at-risk students with the essential elements of a restructured classroom while recognizing the different abilities and backgrounds among them; and (3) the need to allow each learner to become self-regulatively inventive and capable of careful analysis. (Contains 281 references.) (LMI)

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COGNITIVE DEVELOPMENT THROUGH RADICAL CHANGE: RESTRUCTURING CLASSROOM ENVIRONMENTS FOR STUDENTS AT RISK

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The prevalent perception is that the student must adjust to the teachers and the school, while the later remain fixed and unchanging. It is important to develop the reverse and opposite approach which focuses on the need of the system for structural modifiability and maximum flexibility. Responsibility for the student's failure always lies with the educational system rather than with the child.

S. Kaniel & R. Feuerstein (1989)
Special needs of children with
learning difficulties
Oxford Review of Education, 15(2),
p. 177.

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For nearly a decade, American education has been engaged in a major examination of how to reform itself. Report upon report has detailed the need, if not the alternative paradigms, for extensive revamping of the goals, means, and outcomes of preparing graduates for a new world and a new century (Adler, 1982; Goodlad, 1984; Sizer, 1984). What was previously "school reform" or "educational improvement" has become a demand to "restructure" the entire system — not merely tinker with but radically redesign current, less-than-viable models.

At the same time, government officials, business leaders, and various educational researchers have contributed views of the specific problems they believe need to be addressed in this extraordinary effort (Carnevale, 1991; Conley, 1991; McDonnell, 1989; Schlechty, 1990). They are eager to suggest solutions they believe show promise for needed school change. In terms of educational activity, a great deal of this energy has been expended since the publication of **A Nation at Risk** (National Commission, 1983). Now the time is ripe to see how well focused this era of educational reform has become. Does it make a difference to teachers and students in the classroom? Does it serve the neediest as well as the most accomplished students in America's schools? Is there a national consensus as to how the nation's schools should change, and **why**?

The Problem of Radical Change

Although restructuring education means different things according to different perspectives, the larger dimensions of current demands for change are fairly well agreed upon. "Dynamic and unanticipated global changes of a profound sort are shaping the world," says one report (Council of Chief State School Officers, 1991, p. 1), and with these changes come necessary shifts in political, economic, and social structures. The first aspect of restructuring suggests education must keep up with the global workplace and help American institutions prepare **all** employees for the higher-level skills required in an increasingly technological, computerized world (Secretary's Commission, 1991).

Over the long haul, and into the twenty-first century, some say America must attend to the many complex transitions in its post-industrial economy or its workers may be forced to accept the alternative of lower wages and lesser work (Commission on the Skills of the American Workforce, 1990). On the heels of Russia's disintegration and with the realities of Japanese competition, America's reform educators seek a new paradigm for the nation's schools that will enable the nation to retain, or regain, its world-wide competitiveness.

A different understanding of learning is a second aspect that marks the vision of a restructured school, and with it a keener insight into the development of human potential (Dickinson, 1991; Feuerstein, 1990). The more traditional outcomes of America's schools in the 20th century — academic success for some and marginal failure for many — are now held in grave doubt and are considered inherently unequal (Darling-Hammond, 1990). Many reformers maintain that workers at all levels must develop the abilities to learn more easily and adapt flexibly to new circumstances. Whether college-bound or workplace directed, every citizen will need to be able to read complex materials, understand them, and apply multiple skills of literacy and numeracy to tasks associated with such materials (Brown, 1991a; Zuboff, 1988). Today, the "one-literacy schoolhouse," where knowledge is merely collected in a narrow, cumulative framework and then tested by traditional psychometric means, is as outmoded as a communication system dominated by print or a government insensitive to the influence of mass media.

Underlying this new appreciation for learning is an assumption regarding the importance of the learner's **active participation** in restructured schooling, as though the end of the century has somehow returned to John Dewey's (1964) initial vision of education and democracy (Glickman, 1991; Presseisen, 1991). The role of individual development and the significance of authentic student achievement in building intellectual competence are restructuring issues underscored in this context (Newmann,

1991). Being educated today requires that what is studied at school must mean something to the learner and change his/her perspective about the topic under examination; it calls for a particular knowledge base that is intellectually dealt with and, ultimately, reconceived. The relatively short time spent at school — compared to other activities in which students are engaged, like television viewing — must reach far beyond:

> . . . the basic decoding and encoding, even beyond basic factual knowledge, to encompass understanding how different people know what they know, communicate, think, and attack problems. Always implicit — and explicit — is the assumption that one cannot acquire such an understanding without **practicing** [emphasis added] the requisite kinds of thinking, communicating, and problem solving. (Brown, 1991b, p. 142)

In one sense, restructured schooling means the very definition of school is being reformulated. In terms of learning experience, school occupies a unique juncture between initial rearing in the home and community and ultimate performance in the world of work. In the dynamic framework of change and the growing sophistication of the global marketplace, schools are emerging as special locales for creating and refining learner competencies. To be effective, educational institutions are now also required to become human resource development centers, not mere sorters of ability. In particular, schools must address the learning needs of every student, even those historically most poorly served.

In this new view of education, there is an assumption that schooling must be involved in the enhancement of every student's learning potential. The primary focus of this chapter addresses the concerns of both Hodgkinson (1985, 1991) and Hilliard (1991); that is, how can school environments be restructured to address the key requisites of **cognitive development** of every youngster in America, including those most at risk of school failure? As the recent riots in Los Angeles indicate — in terms of the changing demographics and severe deprivations affecting the school populations of America's major cities — if we have the will to educate all our children then we must address this

question. The historic concerns related to changing American schooling and the research underlying them are the focus of the following section, after which the essential elements of a restructured classroom environment are examined indepth. The chapter then presents implications of this examination for at-risk students and their learning. The final section summarizes the findings of the study and projects needed future research and development.

Historic Concerns and Restructuring

Ideas about reforming America's schools are rooted in various historic issues that influence changes in many social institutions. Four areas of concern are relevant to the focus of this study: an understanding of the roots of the cognitive revolution, the impetus of the current teaching thinking movement, the nature of restructured classroom environments for learning, and the needs of a burgeoning, at-risk student population in our nation's public schools. It is proposed that research and analyses of these topics form a basis for understanding the needed alterations in American schooling.

The Roots of the Cognitive Revolution

To understand the various viewpoints of restructured schooling, one needs to appreciate the impact of the so-called "cognitive revolution" that occurred during the second half of the twentieth century (Baars, 1986; Gardner, 1985). Cognition is a branch of psychology that gradually has become a discrete science on its own. As an interdisciplinary approach, it offers new ways of examining mind and mental processes in humans, other animals, and even machines. Studies of intelligence (natural and artificial), memory, brain research, and creativity in many contents are only a part of the emergent literature on cognition (Diamond, 1988; Gardner, 1985; Penrose, 1989). "The word 'cognitive' may suggest that this field deals not with the whole mind but only with knowledge, including perception, reasoning, language, and even learning," says Boden

(1990, p. 9). But cognitive scientists also seek to explain purpose, emotion, and even consciousness. In cognitive neuroscience, the special connections between mind and brain are pursued as related parts of an integrated, intelligent system (Miller, 1989). It is not surprising that schools — as generators of thoughtful learners — would find much to explore in the field of cognitive science. But such a relationship has not always been in fashion and, currently, many schools remain unaware of this content and its implications for curriculum, instruction, and assessment.

For a long time, developmental psychologists were the lone voices interested in the importance of cognition for schooling. With them, some early childhood specialists and special educators stood opposed to an educational psychology — particularly as practiced in the United States — marked by static behaviorism and mechanistic theory (Baars, 1986; Elkind, 1979). The focus on the developing learner, the explicit instruction of thinking and metacognition, and the critical importance of learners' dispositions and attitudes, as well as the emphasis on the social context of intellectual change, have all been outcomes of the new hegemony of cognition in the world of teaching and learning (Collins, Brown & Holum, 1991). At the same time, however, teacher preparation and program evaluation research resisted these new modes (Beyer, 1988; Detterman & Sternberg, 1982; Dillon & Sternberg, 1986; Resnick & Klopfer, 1989; Sternberg, 1982). Today, educational research is rediscovering the works of Vygotsky (Kozulin, 1990; Lipman, 1991; Moll, 1992; Wertsch, 1985) and Feuerstein (Jones & Pierce, 1992; Lidz, 1987; Presseisen & Kozulin, 1992; Sharron, 1987). It is confronted by a rich literature on cognition which maintains that thinking and comprehension actually can be taught to all children (Bransford & Vye, 1989; Haller, Child & Walberg, 1988). Thus, says Costa (1991), if restructured schools are inherently places of cognitive development, they must—by definition—also be organized as institutions that are "homes for the mind."

Restructured schools, in this view, are places in which teachers strive to be cognitively creative in their instruction, where, as lifelong learners themselves, they seek

to refine their professional ability to enhance every student's autonomy and ability to think, and where they constantly seek to create conditions for optimal student achievement. This is the heart of the new cognitive paradigm in education. It is a model that stresses the explicit need to teach students thinking — albeit in particular contents — and to focus on intellectual concerns as the central purpose of schooling.

The Teaching Thinking Movement

The teaching of "thinking" to all students in school is relatively a new concept in education, although the general goal of thoughtfulness has long been a hallmark in liberal education (Paul, 1987; Resnick, 1987a). Essentially, the current movement developed to counter the "back to basics" view as an inadequate goal for youngsters who will work most of their adult lives in the 2lst century. Teaching thinking first and foremost involves cognitive outcomes; it seeks to make learners more successful in their academic achievement by helping **all** students to improve their intellectual ability. The movement also seeks student autonomy and independence of thought as an ultimate aim (Kamii, 1984).

Advocates of teaching thinking have proposed the instruction of various specific cognitive operations or skills (Beyer, 1988; Marzano et al., 1988), and the advancement of subjective dispositions (Ennis, 1991). Comprehensive listings of these processes vary according to specific objectives, such as a goal for critical thinking expertise, or creative design outcomes, or problem-solving strategies. Whatever the specific objective, several key assumptions are usually operative in all teaching thinking efforts: (1) the student needs to be actively involved in **using** the particular skills, so that his/her adaptation and control over the processes increase; (2) intervention or instruction planned for the learner should be tailored to meet his/her distinctive needs, should involve social interaction as well as personal reflection (especially as facilitated by a more knowledgeable mediator), and should aim to develop the mental potential of the learner as far as possible (Feuerstein, 1990); and (3) krowledge areas within the curriculum

should be integrated with the thinking operations as quickly as possible, and be applied in varying contexts and settings (Collins, Brown & Holum, 1991; Nickerson, 1986).

Teaching thinking is associated with multiple literacies and generally focuses on higher-level content, even for young children (Brown, 1991b; Eisner, 1982). The mere coverage of subject matter, the heart of the old paradigm of schooling, has been replaced as a goal for all learners by deeper understanding of disciplinary constructs, more sophisticated problem-solving strategies, and an awareness of alternate approaches to characterizing particular subject matters. The current thinking movement seeks to make students adept at building connections among similar constructs and, ultimately, aims at operational, if not systematic, transfer among similarly-patterned knowledge areas (Perkins & Salomon, 1988; Sternberg, 1990a). Domain-specific knowledge combined with higher ability in science, for example, is projected to help students develop both a conceptual and a practical understanding of scientific reasoning and inquiry that goes far beyond the memorization of discrete facts or even carefully-assembled, but rote-learned, "experiments" (Adey, 1990).

There are a variety of approaches to implementing teaching thinking in the school's curriculum (Presseisen, 1992). In one sense, every academic area has sought to make its subject more thoughtful and students more strategic. These applications have benefitted a great deal from specific thinking programs that have been developed by researchers seeking particular objectives, such as teaching philosophy and reasoning (Lipman, Sharp & Oscanyan, 1980), remediating particular cognitive dysfunctions (Feuerstein, 1980), and developing critical thinking ability (Pogrow, 1992; Winocur, 1986). The impact of these programs has been the subject of various research-based examinations (Chance, 1986; Sternberg & Bhana, 1986). Although these efforts have been found to be generally effective, more objective and extensive research is still needed. Training for these programs and various support efforts to aid their

implementation are currently being conducted across the United States, as well as around the world (Presseisen, 1992).

It must be remembered that teaching thinking is a revolution in process. Although keenly intertwined with the movement to reform educational practice, and talked about extensively in educational research literature, there is no guarantee that it is a revolution that will succeed. Much depends on whether schools are successfully restructured, and what is focused upon in that transformation.

Restructured Environments for Learning

Although there is no concise, commonly held definition of restructuring, nor a single model that can be universally applied, there is general agreement on what counts as school restructuring and what does not (Harvey & Crandall, 1988; Smey-Richman, 1991). Since restructuring advocates believe that schools in their current form are performing about as well as possible, restructuring is not aimed at adding more of the same or making significant improvement to the current structure (Goodlad, 1984; Schlechty, 1989). Rather, restructuring involves altering a school's pattern of rules, roles, and relationships — both within one building and among the several schools in a district — in order to produce substantially different results from those currently obtained (Corbett, 1990; Schlechty, 1989; Sparks, 1991; Wilson, 1971). The shared belief that the current system must be dramatically rethought and redesigned to be more effective underlies all discussions about school restructuring. Herein lie the ties to both the cognitive revolution and the goal to teach intellectual skills.

The attractiveness of restructuring as a theme for educational reform may stem from its ability to "accommodate a variety of conceptions of what is problematical about American education, as well as a variety of solutions" (Elmore, 1991, p. 4). Since opinions vary, a number of schemes for categorizing restructuring activities have been proposed (Council of Chief State School Officers, 1989; David, 1987; Elmore, 1988; McDonnell, 1989). These schemes usually include three main themes: (1) focusing on

teaching academic subject matter in ways that promote understanding and problem-solving, (2) shifting power toward individual schools and the people who work in them; and (3) ensuring the accountability of educators to their clients and to the broader public (Elmore, 1991). Thus, reformers have focused on four broad dimensions of restructuring: curriculum and instruction, authority and decision making, new professional roles for teachers; and accountability systems (David, 1987). A fifth dimension, collaboration with others, is also often added (Smey-Richman, 1991).

While for analytic purposes it is useful to treat each restructuring dimension separately, in practice reform proposals frequently address more than one dimension simultaneously. Also, regarding practice, the overarching criteria for judging the potential effectiveness of a reform effort lies in its link to student achievement and other desirable student outcomes. Choosing a single dimension as a point of departure for school restructuring has serious implications for both the process of reform and anticipated results (Elmore, 1991; McDonnell, 1989). Furthermore, changes in one dimension are not always consistent with changes in the others.

In several restructuring schemes, curriculum, instruction, and assessment are the three central school variables examined because they focus most directly on student learning (Conley, 1991). They are also the key concerns of a teacher's behavior and understanding in creating a seminal environment for intellectual change. If one were to restructure the classroom environment as the major point of teacher-student-learning interaction, what would such an experience look like? Presseisen (1992) suggests:

> The construct of a 'learning environment' is an important concept on the road to intervention. Environment is more than mere surroundings or the 'climate' of a classroom. A learning environment amply provides social opportunities for instruction, and when mutual and reciprocal, for learning. Such an environment includes provocative information, but also feelings, dispositions, and lively models of cognitive strategizing. It is a qualitative locale, a nurturing, mediating, and mind-expanding exploratorium. (p. 11)

Advocacy for restructured schools must deal initially with the three variables of curriculum, instruction, and assessment, and how these variables go together in an environmental whole. How they influence the diverse students in a given classroom then becomes the essence of education's radical change. In the new paradigm for schooling, how these variables are addressed by the teacher, both in everyday and long-term planning for learning, is the key to student intellectual development. Nowhere is this more significant than in understanding students at risk of school failure.

The Needs of At-Risk Students

Just as there is no one, commonly held definition of restructuring, there is no one, commonly held definition of our nation's "at-risk student" population. Although Comer (1988) states that in this complicated age all students are potentially at-risk, for purposes of this study the at-risk student is the low-achieving learner plagued by academic failure and, unfortunately, tempted to drop out of public school. These are the children with underdeveloped talents who, through no fault of their own, are ill-prepared for schooling, for academic endeavors, and for later life and work success. Sadly, the number of youngsters for whom schools are such unhappy and unthoughtful places is steadily increasing. Hodgkinson (1991) maintains that at least one third of the nation's children are at risk of school failure, **even before they enter kindergarten!** In both urban and rural areas, many students are leaving school without diplomas, and still more find little meaning in their schooling (Beyer & Smey-Richman, 1988; Mirman, Swartz, & Barell, 1988; Report on Education Research, 1992). These problems have serious implications for the individual learner, for beleaguered educational systems, and for American society as a whole.

In many cases, at-risk students have not been presented with the same opportunities to become successful, thoughtful learners as have their higher achieving peers (Passow, 1991). Minimally challenging school programs have been compounded by discrimination — racial, cultural, class, sex, and handicap — and lowered

expectations. Lowered expectations, in turn, lead to an overemphasis on drill, remediation, and discipline — practices which perpetuate low self-esteem, a lack of motivation, and student alienation. More important, cognitive research has challenged the assumption of a sequence of activities from lower level "basic" skills to higher order "thinking" skills in a reductionist manner (Kozulin, 1990; Means & Knapp, 1991) Indeed, research shows just the opposite. Processes such as making inferences, constructing meaning, and problem solving are all part of a constructivist approach to learning (Fosnot, 1989; Resnick, 1987a). It is these complex cognitive abilities that are the "new basics" of the 2lst century, the very outcomes which the National Assessment of Educational Progress data indicate are not currently well-developed in the majority of the nation's students and, particularly, not in at-risk student populations (Educational Testing Service, 1990).

The timely reform issue is not so much to raise educational standards for "at-risk students," but to create a kind of schooling in which **all** students receive support in striving to achieve higher standards and greater expectations (National Coalition of Advocates for Students, 1991). That is the real challenge of restructuring education for the coming millennium. The new educational paradigm must be grounded in both a commitment and a researched knowledge base which demonstrates that all students have the potential to be successful, thoughtful learners (Costa, 1991; Feuerstein, 1990). America's at-risk students are no exception.

The major problem that school restructuring needs to examine is the creation of a new learning environment for all students, including student populations considered at-risk of failure in elementary and secondary education. In particular, this examination must answer three key questions:

1. How can the vision of restructured schooling be interrelated with the cognitive paradigm — the movement to make schooling an intellectually developing experience?

2. How can every child, even those at-risk of academic failure, be prepared fully as thinking persons?

3. What kind of learning experiences need to be developed to serve diverse students, many of whom have been poorly served by traditional educational practices?

These are the significant queries which guide the presentation of the remainder of this chapter.

Building a Restructured Classroom Environment

The most important task of this study is to determine, as completely as possible, the essential elements of a restructured classroom environment, for what goes on in the classroom is most influential on what students are enabled to do (Pauly, 1991). By examining pertinent literature, by seeking relevant research — especially as related to the historic concerns noted earlier — and by considering what is empowering to a youngster's cognitive development, eight elements appear to be the major characteristics of such an environment.[1] It is the authors' position that the radical change needed in a learner's experience at school involves transforming the classroom in such a way that all eight elements can operate fully and strongly influence the child's advancement.

The Essential Elements of Restructured Classroom Environments

1. The purpose of the classroom is to develop every student's mind and to enhance every learner's potential; the primary goal of a classroom restructured for learning is to increase — for every student — understanding and higher-level comprehension of the several subject matters that generally constitute elementary and secondary schooling.

2. The long-term goals of this environment are the autonomy of the learner, the development of self-regulation, and the independence of lifelong learning. Everyday activities are to be consistently planned to reflect these objectives.

3. The learning processes emphasized in this environment involve cognition, metacognition, and conative dimensions within content epistemologies that seek both individual and group gain.

4. In this environment, all students, even those of differing abilities and diverse backgrounds, are viewed as naturally active and curious constructors of meaning

[1] See endnote on p. 56.

who, over time, modify or seek to create conceptions of information and experience at their unique rates and in their preferred styles.

5. The teacher encourages and provides for important social interactions in this environment, thereby assuring each student a personalized, respectful, and meaningful experience in learning and cognitive development.

6. The teacher in this environment acts as a facilitator of student learning, a mediator, a coach, a mentor, and a collaborator with students and other teachers in the larger school setting.

7. The classroom is linked to life beyond its boundaries, i.e., to the school as a whole, to other educators and staff, and to the entire community, including parents and other agents.

8. The restructured classroom environment for learning integrates curriculum, instruction, and assessment in such a way as to maximize the achievement of these "essential elements" in the dynamic and practical aspects of everyday schooling.

The educational literature supporting these elements is extensive and varied. Much of the research on teaching higher-order thinking strives to realize the first element, increased thoughtfulness, as does much of the current discussion on literacy and numeracy development (Baron & Sternberg, 1987; Brown, 1991a; Hiebert, 1991). While it is acknowledged that particular contents are the appropriate domains of an education, knowing these contents and connecting them through meaningful understanding are central to the processes of learning and interpretation. The long-term goals of autonomy and lifelong learning in the second element are the outcomes for which restructured schooling must strive, countering the reductionist view of "basic skills training" and the "quick fix" mentality of programs that are trendy and superficial (Wittrock, 1987). A rich store of research information on learning and teaching within the cognitive framework is available and needs to be used by classroom practitioners in the restructured school.

Elements three and four present learning as a constructive process with building blocks that are fairly well understood and defined. In schooling, it is not sufficient to concentrate on cognitive operations alone. How metacognitive and conative dimensions interact with content knowledge are also important relationships (Presseisen, 1990). One

must keep in mind that reasoning and intelligence are an individual's **developed** abilities, and that it is children's conceptual growth and mental modification **over time** that are the fundamental outcomes of schooling (Brown & Campione, 1986; Feuerstein, 1980). Beyond these outcomes, an awareness that culture and consciousness are developed through socially interactive learning may be one of the most important aspects of restructured education (Kozulin, 1990).

The responsibility of the classroom teacher is underlined in elements five and six. Schooling is a very human enterprise and teachers play the key roles of diagnostician, interpreter, creator, and communicator in their mediational task (Feuerstein, 1990). Although materials and methods are significant in the restructured classroom, the ultimate goals are the experience and meaning their use has for the engaged learner (Kamii, 1984; Shulman, 1987; Wittrock, 1987). Similarly, the teacher helps link the classroom to other environments that impinge on students' lives, notably the rest of the school community and the children's experiences outside school (Comer, 1980; Wehlage, Rutter, Smith, Lesko & Fernandez, 1989). This connecting aspect is the underlying emphasis of the seventh element.

Finally, the eighth element calls for an integration of curriculum, instruction, and assessment in the restructured classroom, in order to maximize the other seven dimensions. Traditionally in education, these are rather loosely-coupled concepts. Curriculum developers and instructional specialists sometimes integrate their efforts; however, neither of them talk frequently with assessment personnel (Valencia, 1990). The current thrusts for meaningful instruction and "authentic" assessments have heightened understanding of the need for such collaboration (Nickerson, 1989; Stiggins, Rubel & Quellmalz, 1988; Wiggins, 1989b, 1992). The following sections examine at greater length the need to integrate curriculum, instruction, and assessment in the restructured classroom environment.

Curriculum in the Restructured Classroom Environment

By tradition, curriculum is the content-oriented part of a school's program, the substantive aspect of what needs to be studied and learned (Eisner, 1982). Until recently, discrete subject matters — heavily influenced and conceived by university specialists — was the preferred curricular approach of American schooling (Tanner, 1989). But cognitive concerns in education challenge that perspective. A more dynamic conception, one in which teachers and students interact in the construction of ideas and richer meanings, has become the focus of the supportive learning environment sought for all students. The essential elements presented in this study form the underpinnings of such a curricular conception.

The curriculum of a restructured classroom needs to be organized mainly to help students develop and use ideas to understand formal knowledge systems, but, at the same time, to assist learners to formulate conceptions that are transferable to problem-solving in their everyday lives (Beyer, 1988; Presseisen, 1987; Sternberg, Okagaki & Jackson, 1990). The content of such a curriculum needs to include the skills and higher processes of cognitive functioning, but also the dispositions and awarenesses of more conative striving (Ennis, 1986; McCombs & Marzano, 1989). Affect and emotion can be key to the creative dimensions of such a cognitive-based education, and intrinsic interest and curiosity may be as motivating to meaningful learning as a teacher's absolute authority or the competitive framework of the more traditional classroom. Thus, the epistemologies of classic school subjects need to be related to both cognitive and conative aspects of the curriculum, because the concepts of a particular discipline are the "holding bins" of students' experience in subject learning and the points of departure for learners' interests and thinking.

The curriculum of a restructured classroom is chiefly centered on the student as a constructor of meaning and a manager of learning. There are at least four major concerns that such a curriculum needs to address:

- *Managing information* - many bits of knowledge or information are constantly present in the classroom environment; the student needs to develop skills and processes to organize these bits, and gradually to develop mental constructs that make handling these data meaningful and connected to other things that need to be known and used.

- *Managing tasks* - learning in the classroom involves activities or problems that require certain routines to complete successfully; the student needs to develop strategies for working on these tasks at school and for understanding a variety of procedures that may have differing influences over ultimate task completion.

- *Managing self* - successful learning involves awarenesses about intelligent performance by oneself and others; the student needs to develop and apply these awarenesses in a user-friendly setting to improve learning and performance.

- *Cooperation in learning* - successful learning is based on social collaboration and exchange and on the ability to communicate one's ideas; the student needs to have experience with such dynamic exchange and time to reflect on the consequences that are derived from such interaction.

Many of the ideas in current literature on restructured schooling address one or more of these concerns. A focused, practical question to ask is: What do teachers need to do with curriculum in order to help students be successful in terms of these four concerns?

Managing information. There is a great deal of information to be mastered at school. An emphasis on the cognitive development of learners highlights the point that thinking operations need to be consciously developed in relation to regular subject matters, particularly relative to the "key concepts and strategies that students must acquire to function effectively in a particular domain" (Bransford & Vye, 1989, p. 182). A curriculum needs to expose students to exemplary thinking in history, language, or science which shows both how ideas are formulated and how they are represented in that particular domain. But mere exposure is not sufficient. Bruner (1960) said "teaching is not telling," and Oliver (1990) considers basic information provision only "technical knowing." To present a list of higher-order thinking skills or to display key ideas of a particular subject is merely the first curricular act, a starting place for planning a course of study.

At a second level of curricular understanding, knowledge needs to be integrated in various ways in the instructional program (Martinello & Cook, 1992). Expert teachers understand the challenge of such a problem. Leinhardt (1990) suggests these teachers use their "craft expertise" within a content domain to help them know which parts of the rich information pool available are significant for teaching and which parts are irrelevant. She agrees with Newmann (1987) in emphasizing the need for **indepth** experiences in a content area, so that students come to understand not only the apparent subject matter but also the kinds of mental processes and operations that constitute a complex domain. Shulman (1987) describes the pedagogy involved in raising students' understanding of literature from literal meaning, to connotative relationships, to symbolic interpretation, and, finally, to a level of application and evaluation that has meaning in their own lives. Material in such a curriculum is selected to be influential on the learner because it has the potential to transfer and transform, and because it leads to "grounded knowing" that captivates and inspires (Oliver, 1990; Perkins & Salomon, 1988; Schama, 1991).

The problem of data in an information-rich age raises another issue of curriculum integration. Exactly how should a classroom teacher blend the thinking processes of cognition and the concepts of a knowledge domain in a student's course of study? Some researchers, and many textbook publishers, maintain these two information bases need only be commonly presented or mutually infused into subject matter (Ennis, 1989; Swartz, 1987). Others call for interdisciplinary or multidisciplinary reconceptualizations, for building newly-connected knowledge frameworks using cognitive functions as a common foundation (Fogarty, 1991; Jacobs, 1991). Obviously, articulation among subject teachers and a debated scope and sequence of appropriate topics, agreed across grade levels, follow from this position. But what is most essential, according to either position, is that mastering thinking operations and not mere content coverage lies at the heart of understanding content disciplines. These operations are also basic to generating student

meaning (Ammon & Hutcheson, 1989). How are curricular elements to be constructed to make learning exciting and intellectually relevant for all students in a classroom? This challenge leads to the concern for teach-ability and student response in learning (Bereiter & Scardamalia, 1992).

Managing tasks. In the limited hours students attend school, a finite number of activities or specific lessons can be included in the curriculum. How can teachers assure that these activities lead to the meaningful outcomes a cognitive experience requires? Shulman (1987) suggests that one of the most important aspects of pedagogical expertise involves knowing what problems to present in a course, when to present them, and how to relate them to student activity in a lesson design that challenges student thinking and motivates student interest and activity. Vygotsky's (1978) cognitive theory emphasizes the concept of "tools" in human learning, concentrating on the connections between material and psychological instruments that influence conception, on one hand, and lively social interaction, on the other. The problems of content presentation focused on "toolness" lie at the center of task management in a curriculum (Kozulin, 1990). The tools a teacher prepares or selects for classroom examination must address issues of cognition and content representation, as well as provide a mechanism for conveying meaning in the teaching-learning act.

What are the major material tools of a given discipline? What problems and problem formations do students need to be prepared to solve? What documents or key products represent the best display of expertise or beauty in a particular domain? These are questions that form the foundation of curriculum decision making. They are the heart of what a teacher needs to determine before the specific tasks of classroom work can be prepared. In short, concrete tasks need to be designed consistent with the standards of excellence implied or explicated in a content domain. At the same time, educators must consider what is most elemental for learning a particular content, as well as the skills, attitudes, and knowledge that make that subject intellectually come alive

(Presseisen, 1988b). As Benjamin Franklin suggested over two centuries ago, what is most useful in the course of study needs to be distinguished from what is merely ornamental in the curriculum (Franklin quoted in Bruner, 1960, p. 4).

The current task concerns of curriculum focus on student activity and appropriate designs to accommodate various developmental levels of conceptualization. Science teaching in the middle grades, for example, is very involved with "hands-on" experimentation and authentic activity presentation (North Central Regional Educational Laboratory, 1991). Mathematical reasoning, under the new professional guidelines of the National Council of Teachers of Mathematics, seeks real world applications of theorems and axioms, and still recognizes that not all of the variables in a given problem can be responded to by every student in any one lesson (Black, 1989; Lockwood, 1991). Language arts programs emphasize more "holistic" experiences across the various genres of expression, leading to greater comprehension and more creative understanding of complex ideas (Palincsar & Brown, 1989; Scardamalia & Bereiter, 1985; Shanahan, 1991). Such classroom tasks need to be carefully positioned for any given population of students. The tasks need to be inviting, perceptually clear, and attractive; they should be neither too difficult nor too easy. They need both to challenge and inspire. They need to fit the individual and the group.

An underlying problem of the curricular task is the question of "bridging the gap," that is, to help students move from their initial conception of what is in the curriculum to something further along the increasingly sophisticated sequence of ideas in the subject matter (Rogoff, 1990). How do students internalize what is presented in class? How do they come to understand the qualities of curricular content spontaneously and with a commitment to resolve discrepancies? The restructured classroom conceives of this problem as one of **strategic** learning (Belmont, 1989). For Collins, Brown, and Holum (1991) this constitutes the central issue of cognitive apprenticeship. Based on Vygotsky's (1978) notion of the "zone of proximal

development" (ZPD), apprenticeship requires that classroom tasks not only present information to the student, but also provide experience by which he/she is able to go beyond what is presented. The student becomes intellectually engaged in learning by relating what is already known to what might be. Every student's potential for learning becomes mutually involved in the real experience of a specific lesson. If curriculum hinges on individual meaning as well as strategic participation, then the curriculum must account for learner awareness of both his/her own role in the instructional process, and the influence of others in the classroom. This conative dimension of the essential elements suggests a third major concern of curriculum.

Managing self. In order to achieve optimal student experience, the curriculum in a restructured classroom environment must actively engage every student in his/her own learning and knowledge building. Self-regulation and metacognitive skill acquisition are two vital aspects of student involvement in learning. The development of self-regulation is a cornerstone of learner autonomy and lifelong learning. It involves the students' "awareness of the variables that are important to learning and their ability to take control of their learning environment" (Palincsar & Brown, 1989, p. 19). Metacognitive skill development relates to strategies for learning particular content and heightened awareness of the cognitive demands of specified classroom tasks.

McCombs and Marzano (1989) conceptualize **self-as-agent** as a central phenomenon that brings together both a student's "skill" and "will" in the development of thoughtful behavior. They theorize that such integration makes possible the development of personal expertise in a particular task or subject, driven initially by the will or motivation of the learner, and subsequently by instructional intervention that assists in the delineation of task and the self-regulated development of competencies. The meshing of the learner and the learning is central to a restructured classroom. To be educated is to be **personally** involved, as well as cognitively engaged, in the community of thinking that is fundamental to a learning environment.

Given these requisites for the restructured classroom, how can a curriculum contribute to developing a student's self-regulatory behavior and metacognitive awareness? Teachers need to focus on materials and activities that arouse student curiosity and engage their interest. Providing roles for student choice and voluntary association at the outset of a classroom assignment are important initial concerns. Casting problems and activities in novel and challenging ways are additional considerations. After students are involved in an assignment, relating the curricular materials to strategic skill development becomes a major concern of pedagogy. For example, Palincsar and Brown (1989) identify six strategies that are central to the student's ability to monitor and foster reading comprehension. These strategies then become the scaffold, or lattice, upon which particular reading activities are made meaningful.

In addition to developing strategic abilities within the specific content, students must learn self-regulatory procedures that enable them to efficiently accomplish specific learning tasks embedded in a particular curriculum. Sternberg (1990a) cites executive monitoring skills, accessed through an individual student's development of personal style, as important for knowledge development. He and his associates (Sternberg, Okagaki & Jackson, 1990) maintain that the student, while simultaneously learning content controls, needs to consciously improve his/her own learning techniques. The use of prior knowledge, visualizing contents, recognizing a point of view, looking for effective learning strategies, listening for meaning, and learning by doing are examples of such techniques. The curricular problem for student advancement is to create classroom activities and a learning environment in which these dual improvements can take place

McCombs and Marzano's (1989) concept of the self-system in cognitive development also raises the issue of what is unconscious in the student's awareness. They see the emerging self in holistic terms, a "consciousness that directs more

unconscious processes" (McCombs & Marzano, 1989, p. 3). This highlights the question of how a curriculum can foster a student's **indepth** perspective of subject matter — mindful of the time constraints on instruction and learning. Perkins (1991a) sees this concern as part of the problem of developing insight about a particular subject; he ties this to goals of teaching for transfer and building an integrated curriculum. Suhor (1992) suggests that a whole range of semiotic functions are introduced with this problem. How can the classroom teacher help students "go beyond the information given" (Bruner, 1964) and make creative connections to other knowledge? The curriculum must be used to help students trust their own minds, to build connections to what they know and do beyond the classroom, and to consider their own and their classmates' ways of thinking. Through such elaborative experience, the learner-as-self becomes defined, cognitive competence becomes owned, and commitment to learning is enjoined. Thus, Anne Frank and Romeo and Juliet will emerge from the pages of literature and extend a student's understanding to his/her own consciousness.

Cooperation in learning. The interactive, social nature of the restructured classroom puts a high premium on cooperative activity as a curricular requisite of learning. Students need to work on mutually challenging tasks that build complementary roles and perspectives, and which engender respect for diversity and variation. Cooperative learning methods assume that students can learn **from** as well as **with** their peers, that work can be pursued by collaborative teams, and that, with some well-thought-out, group-based assignments, prepared by sensitive teachers, different youngsters with varying abilities can meaningfully contribute to a unified assignment (Slavin, Karweit & Wasik, 1991). In such cooperative learning, the talent of every youngster can be bolstered and the meaning of the shared task internalized (Presseisen, 1992).

The social context of the classroom is also important to Vygotsky (1978), who viewed learning as embedded in experiences bound by communication and exchange.

Vygotsky maintained that the student becomes aware of his/her own cognitive operations only **after** they are practiced and endorsed by others. Further, he proposed that scientific concepts in that exchange need to be both built into the formal context of a body of knowledge or subject matter and systematized through **everyday use** by the learner and his/her peers (Kozulin, 1990).

The role of the teacher as mediator in the learning exchange is a critical link between the student and the curriculum. Good teachers serve as both interpreters and questioners who assist students' construction of knowledge and finely tune classroom exchange for maximum meaning and student benefit (Feuerstein, 1990). Such teaching establishes where a student is in the ZPD and determines the most productive activity for both the individual learner and for groups of learners in a classroom (Brown & Ferrara, 1985; Bruner, 1984). Similarly, Feuerstein's "mediated learning experience" (MLE) relates the learner's needs to the concepts that ought to be known by the student in the interactive exchange. The teacher is both a tool of instruction and a creator of additional classroom tools. Through such a mediational approach, social interaction is the essence of the environmental exchange. The teacher provides the "bridge" to student transfer and the actual subject learning.

Cooperating with others, then, raises the need for building a social presence in the course of schooling (Brophy & Alleman, 1991). Making choices, building on social networks, figuring out and applying rules, and extending various relationships among people and ideas are as much a part of a particular curriculum as the technical components (Sternberg, Okagaki, & Jackson, 1990). How individual students master such social requisites of group learning must be a significant concern of both curricular focus and teacher attention. Such a social dimension is part of the full interpretation of a learner's construction of meaning at school. It remains to be seen how such a curriculum blends with instruction in the classroom.

Instruction in the Restructured Classroom Environment

While curriculum is the subject matter taught in the classroom, instruction is the interaction of the teacher and students with the subject matter (Erickson & Shultz, 1992). Unfortunately, teaching in schools today is mainly recitation, consisting of unrelated teacher questions chiefly aimed at having students deliver a correct answer (Kamii, 1984; Tharp & Gallimore, 1988). According to this tradition, the teacher is the transmitter of knowledge, the student a passive recipient of the message given. Since learning is seen as linear and sequential, students are required to master surface-level information and discrete, decontextualized skills — often using drill and practice — before moving on to more advanced or complex tasks (Gagné, 1970; Popham, 1987). As proposed in the eight essential elements, the cognitive agenda is profoundly at odds with these premises and begins with different assumptions about student learning.

The aim of instruction in a restructured classroom environment is to develop autonomous thinkers and learners who have formulated an internal system for self-improvement (McCombs & Marzano, 1989; Perkins, 1991). Knowledge is regarded as something that must be constructed by the student, rather than facts and skills imparted by the teacher. The learning process occurs when students receive information, interpret it, connect it to information they already know, and readjust their mental structures to accommodate new understandings (Caine & Caine, 1991; Kamii, 1984; Means & Knapp, 1991; Shepard, 1991). In this conception, learning is not lock-step, fact-before-thinking, but a dynamic, continuously evolving process which seeks to resolve learners' cognitive conflicts and carry them to higher levels of thought (Perkins, 1991b; Piaget, 1970; Wood, Cobb & Yackel, 1991).

These underlying assumptions call for a major change in the teacher's instructional role: from information provider to assistor or facilitator of student performance through classroom activities and discussions (Brown, 1991b; Tharp & Gallimore, 1988). When students respond to open-ended questions and are encouraged

to develop multiple solutions to a single problem, the teacher acts as a coach or co-learner, a pedagogue who selects and develops meaningful learning activities (Wood, Cobb & Yackel, 1991). When more indepth explanations are required, the teacher becomes a mediator who provides students with additional guidance, supportive modeling and practice, and interactions with others (Haywood, 1990). Key to all these roles is the teacher's ability to ask more provocative questions and to know the exemplary steps of a youngster's cognitive development (Case, 1992).

As with curriculum, teachers in a restructured classroom must design instruction in concert with the four learner-centered concerns of managing information, managing tasks, managing self, and cooperation in learning. Therefore, another important question of this study asks: What types of instructional experiences should teachers select to enable students successfully to process the school's curriculum?

Managing information. In a restructured classroom, the learner is viewed as an active participant in the creation of his/her own knowledge. Since learners continuously interact and interpret the world, the process of information acquisition is the learner's successive development of structures which are assessed, revised, or replaced in ways that facilitate learning and accommodate the learner's background and purposes (Case, 1992; Hiebert, 1991). When students lack an efficient way of organizing and storing information, teachers should directly supply a beginning knowledge structure to support the development of specific content domains (Beyer, 1987). This strategy provides a meaningful initial context for learning new content or thinking processes, and offers a springboard for knowledge building which, in turn, leads to the formulation of more complex structures. Information organizers and concept attainment are two examples of instructional approaches which assist students' understanding and recall of information.

Advanced organizers are generally introduced prior to new learning tasks to provide relevant anchoring ideas for more differentiated and detailed material to follow

(Ausubel, 1977; Mayer, 1989). While the exact design of the organizer depends upon the characteristics of the learner and material to be mastered, advanced organizers are generally short sets of verbal or visual information that provide a means for generating logical relationships. Beyer (1987) has extended this strategy to his program for teaching critical thinking. Other research shows post-organizers also appear to be effective in facilitating learning and retention of information, even after it is introduced (Alexander, Frankiewicz & Williams, 1979).

By tradition, teachers have taught linear outlining as the primary verbal representation of information. But today, graphic organizers or conceptual models — matrices, webs, cycles, and sequences — are used to reflect better the structure of ideas and, hence, make information more meaningful and memorable (Jones, Pierce & Hunter, 1988-89; Mayer, 1989). Such visual cues become the "tools" of instruction in Vygotsky's sense; that is, they are transformational instruments of thinking (McTighe & Lyman, 1988). Further, student learning is more positively affected when students construct their own graphic organizers, preferably in collaboration with other students, or complete those begun by the teacher (Alvermann, 1988; Moore & Readance, 1984).

Similarly, in a restructured classroom environment, learners should be assisted to construct and refine concepts, preferably with metacognitive awareness of goals and strategies, in response to problem-solving tasks (Schroeder & Lester, 1989; Wood, Cobb & Yackel, 1991). In an effort to solve a problem or make a decision, students' understanding of concepts is enhanced when they engage in "instructional conversation" (Tharp & Gallimore, 1988) or "substantive conversation" (Newmann, 1991). An instructional conversation is a classroom discourse characterized by a dialogic teacher-student interaction: authentic, open-ended teacher questions; teacher questions that build on previous student answers, or "uptake" (Collins, 1982); and sustained discussions in which student engagement is substantive, not just procedural (Nystrand, 1992). Also, as part of this substantive discussion, conceptual change is facilitated when

the learner is encouraged to differentiate relevant from irrelevant concept attributes, distinguish examples from nonexamples, hypothesize the hierarchical relationships among concept clusters, and create their own representative exemplars (Barth, 1991). By participating in such experiences, students will begin to expand their understanding of a concept, and gain more flexibility in their own thinking (Nickerson, 1989).

Overcoming resistance to conceptual change can be a difficult cognitive struggle (Bransford & Vye, 1989; Gardner, 1990). Researchers have found that misconceptions or stereotypes which young children have are so powerful and entrenched that they survive years of formal education (Resnick, 1985). If these inaccurate ideas are allowed to go undetected or unchallenged, the misconceptions can continue to interfere with the students' understanding of important subject matter. Thus, Sternberg (1990a) cites the need to use information in the classroom to create doubt, whet the learner's curiosity, and challenge the constructs that exist. Similarly, Vygotsky's theory cites the useful contrast between scientific ideas (concepts) and a student's "everyday thinking" (Presseisen & Kozulin, 1992).

Managing tasks. The central element of teaching is the way a teacher translates the official or intended curriculum into student tasks or assignments. The teacher's choice of task influences student learning by directing the learner's attention to particular aspects of content (e.g., facts, concepts, principles, solutions) and by specifying ways for processing information (e.g., memorizing, classifying, inferring, analyzing) (Knapp & Shields, 1990). These effects on learning are clearly apparent in the contrast between the outmoded behavioral emphasis on accumulating isolated facts and the constructivist's goal of meaning construction.

In the restructured classroom environment, the student is expected to play a more task-management role. Building toward autonomy, students are expected to assume more responsibility for controlling their learning. While such a goal is laudable, Perkins (1991b) cautions that throwing unprepared students suddenly into complex

cognitive problem-solving situations may actually be a prescription for student failure. Obviously, strategies of coping need to be carefully interrelated with the classroom content and the assigned tasks closely aligned to what students already know. Several intervention models of instruction exist that purport to do this.

A mediational teaching style is one promising approach for assisting unskilled learners to adapt to their expanded task manager role in a restructured classroom. In MLE, Feuerstein and his colleagues (1980, 1985) refer to the unique interactions by which adults intentionally interpose themselves between the student and an external stimulus to alter the stimulus prior to the learner's perception. As part of this process, the mediator selects, frames, and filters the lesson presented, interpreting it for the learner. In addition, mediators interpose themselves between the student and the student's response to the stimuli, thus helping learners be aware of their own metacognitive functioning and their ability to self-regulate (McCombs & Marzano, 1989). Through such an intervention, students are able to perceive their world differently. No longer do they interpret stimuli as random or mere accidental occurrences. Rather, students begin to see learning situations as contextually bound, problems in action about which an array of reactions are potentially effective (Brown, Collins & Duguid, 1989).

According to Feuerstein's theory, the three essential characteristics of every mediated interaction are intentionality (and reciprocity), transcendence, and meaning (Feuerstein, 1990; Presseisen & Kozulin, 1992). The intentionality of the mediator, which is shared by the learner, produces a sense of vigilance that is evidenced by greater attentiveness, focus, and acuity of perception. Closely linked to intentionality is transcendence. This characteristic of mediation interaction refers to going beyond the specific situation or need, and reaching out or "bridging" to goals that may be only slightly, or not apparently, related to the original situation. Finally, MLE is characterized by the meaning the interaction lends to certain stimuli and events. In such an interaction, the event or experience presented to the student carries with it affective,

motivational, and value-oriented significance. It provides a basis that leads the student to become meaningfully involved in the learning. According to Feuerstein (1990) and his associates (Haywood, 1990; Link, 1985), these three mediational characteristics — intentionality, transcendence, and meaning — interact and form the universal, necessary conditions for every successful teaching-learning experience.

The cognitive apprenticeship approach to instruction — aimed at making thinking explicit and visible — is another innovative intervention to help students deal with cognitively complex problems (Collins, Brown & Holum, 1991; Means & Knapp, 1991). Built on a Vygotskian basis, and similar to Feuerstein's MLE, apprenticeship is designed to help students acquire an integrated set of skills through the processes of observation and guided practice (Rogoff, 1990). The apprenticeship approach seeks to promote the development of expertise through the three core instructional methods of modeling, scaffolding, and coaching. Modeling requires the teacher to externalize the usually internal processes and activities, specifically heuristics and control processes, by which the teacher applies conceptual knowledge. Scaffolding seeks to aid the learner in the ZPD, providing just enough support or guidance for student cognitive advancement (Brown & Ferrara, 1985). In this context, the teacher's relationship with students involves the accurate diagnosis of the student's current skill or ability level, and the implementation of intermediate steps of instruction at an appropriate level of difficulty (Rosenshine & Meister, 1992). Finally, coaching — the general process of overseeing student learning — consists of observing students as they carry out a learning task and facilitating the enhancement of their cognitive activity (Collins, Brown & Holum, 1991).

Palincsar and Brown's (1984) reciprocal teaching method offers a third instructional model for developing better thinkers and learners. It has similarities to both Feuerstein's MLE and the cognitive apprenticeship approach. Focused on the area of reading, the Palincsar & Brown intervention centers on modeling, scaffolding, and coaching students in four strategic skills: formulating questions, summarizing,

predicting, and clarifying. Briefly, the procedure begins when the teacher models these four strategies in the context of understanding written passages. After silently reading the text, the students each take turns playing the role of instructor and leading the other students through the four strategies. Initially, the teacher provides sufficient support to allow students to take on whatever portion of the task they are able to do. Gradually, however, the prompts fade until the students can perform independently (Brown, Palincsar & Purcell, 1986; Palincsar, 1992; Palincsar & Brown, 1984).

In all of these models of mediational instruction, the key to a reflective classroom dialogue is how the teacher talks, listens to students, and encourages student-to-student discourse (Englert, Raphael, Anderson, Anthony, & Stephens, 1991). In the traditional classroom, student talk and shared understanding occur minimally (Pogrow, 1991; Tharp & Gallimore, 1988). But in the restructured classroom environment, the teacher acts extensively and responsively to aid student comprehension through a dialogue, or "instructional conversation" (Goldenberg, 1991). A clear focus on the task is the initial step in such a conversation; elaborating that task is the next pedagogical link in the instructional exchange (Stigler & Stevenson, 1991). The teacher listens carefully to understand the student's communicative intent. Then, he/she adjusts the immediate response to meet the learner's emergent understanding (Brown & Campione, 1986; Tharp & Gallimore, 1988, 1991). In all of this, the teacher's charge is to pose questions that assist the students in constructing their own contexts, to help them perform just beyond their current capacity (Englert et al., 1991; Tharp & Gallimore, 1988, 1991). Teacher questions also lead students through appropriate post-activity reflection, sharing insights about what they have learned through the task (Brophy & Alleman, 1991).

Managing self. Not only is teaching the process of truly conversing, it is also the act of facilitating the students' capability to assume full responsibility for their own learning. Nearly two decades ago, Maxine Green (1973) wrote that teaching "happens"

when students can do certain things on their own — for example, when the learner extends him/herself to find answers to questions he/she has posed, when students give reasons and see connections within their experiences, and when they recognize their own or someone else's errors and propose appropriate corrections. In a restructured classroom environment seeking student autonomy, teaching is ultimately assisting students to self-manage and to actualize the concept of self-as-agent, as discussed earlier. But how can students' self-management be promoted in the restructured classroom? What strategies might educators use to teach self-responsibility and self-motivation to every learner?

Using the mediational teaching style based on Feuerstein's theory of cognitive modifiability, the teacher can interpret students' successive encounters with the environment, and promote student awareness of his/her own feeling of competence, using a dual process: first, structuring tasks to permit student success; and, second, interpreting even minimal signs of student success as an indication of increased competence (Clark & Peterson, 1990; Feuerstein & Hoffman, 1990; Haywood, 1990). Moreover, mediational dialogues enhance the student's conception of him/herself as a thinker by providing immediate feedback, especially on process-oriented responses, and making the student aware of the precise aspect of his/her thoughts and behaviors that led to success. Thus, rather than saying "Good job!", the teacher might reply, "Good! You developed a plan and now you know how to proceed." Mediation of a feeling of competence provides a motivational enhancement to seek mastery of increasingly complex and difficult tasks, and is necessary to secure the development of autonomous, independent functioning (Feuerstein, 1990; Markus & Wurf, 1987; McCombs & Marzano, 1989; McTighe & Clemson, 1991).

Just as mediational teachers reinforce the student's self-concept as a successful performer, teachers must also assist students — especially younger and low-achieving students (Palincsar & Brown, 1989; Smey-Richman, 1988; Zimmerman & Martinez-Pons,

1990) — to self-evaluate and to bring their own cognition and behavior under control (Feuerstein, 1990; Smith & Nelson, 1992). Sometimes, self-regulation means the students seek to improve their ability to attend, become more precise and accurate, or inhibit their impulsivity (Feuerstein, 1980; Wittrock, 1990); at other times, self-regulation for academic tasks means setting goals, self-reinforcement, and self-instruction (Smith & Nelson, 1992; Zimmerman & Martinez-Pons, 1990). Classroom instruction to achieve self-regulation includes an awareness of the impact of the environment on one's body, and an understanding of strategies to control external stimuli (e.g., blocking out distractions such as noisy classmates) (Dunn & Dunn, 1987), and internal stimuli (e.g., taking time to examine questions and possible answers before responding) (Haywood, 1990; Zimmerman & Martinez-Pons, 1990). To help students in their efforts to self-manage, teachers can initially use thinking aloud to model self-awareness and self control. Critical to the success of student self-regulation is the teacher's ability to maintain a nonthreatening classroom environment conducive to good thinking — one in which challenge and risk-taking are promoted, and where originality, independent thought, and differences of opinions are welcome (Barell, Liebmann & Sigel, 1988; Caine & Caine, 1991; Marzano et al., 1988).

Metacognition — a component of self-regulated learning (Pintrich & de Groot, 1990) — generally refers to knowledge about, and control of one's own cognitive processes (McTighe & Clemson, 1991; Wittrock, 1990). Metacognition seeks to help students become more strategic in planning, monitoring, and evaluating their mental performance (Barell, Liebmann & Sigel, 1988; Costa, 1991; Flavell, 1976; Palincsar & Brown, 1989). Students experience metacognition when they use their inner voice or self-talk — "language turned inward" which has its origins in social dialogue (Vygotsky, 1978) — to monologue with themselves about their own writing, and to hear what their own writing says (Englert et al., 1991). In composition classes, students can be assisted to adopt more sophisticated metacognitive strategies by using scaffolding tools such as

cue cards, think sheets, or self-checking lists. In writing, scaffolding tools can be designed to reduce the burden of information processing and to support student attempts to plan, elaborate, and revise their drafts at various stages of development (Englert, Raphael, & Anderson, 1992; Rosenshine & Meister, 1992; Scardamalia & Bereiter, 1983). Similarly, thinking aloud and concrete prompts are used as a part of the cognitive apprenticeship model — as in reciprocal teaching — and in other reading programs and mathematical instruction aimed at metacognitive functioning (Palincsar & Brown, 1984; Schoenfeld, 1985; Singer & Donlan, 1982). As students accept more responsibility for cognitive and metacognitive thinking, the use of scaffolding tools gradually is diminished.

More conventional instruction holds that learning is unpleasant and that extrinsic rewards — such as praise, stickers, grades, special privileges, or prizes — are used to induce learning. But evidence within the cognitive paradigm suggests that personal interest and enjoyment in a task may actually decrease when extrinsic rewards are provided (Daniel & Esser, 1980; Smey-Richman, 1988; Winograd & Paris, 1988-89). Students may start an activity for extrinsic reasons and, with time, their goals may become intrinsic to the activity itself (Czikszentmihalyi, 1990). Intrinsically motivated experiences — "flow experiences" — have the universal characteristics of enjoyable activities: matching of challenge with skill (i.e., within the ZPD), clear goals, and immediate feedback, "resulting in a deep concentration that prevents worry and the intrusion of unwanted thoughts into consciousness" (Czikszentmihalyi, 1990, p. 131). To induce intrinsic motivation, mediating teachers must continually project the attitude that they know what they want students to do, that they are eager for students to strive for their best performance, and that learning can actually be both intellectually challenging and personally rewarding (Brophy & Alleman, 1991; Feuerstein, 1990; Haywood, 1990; Willis, 1991).

Cooperation in learning. In a restructured classroom environment, students working cooperatively to accomplish shared goals is the context within which managing information, tasks, and self best occurs. Teachers in such an environment provide for social as well as individual construction of knowledge. Unfortunately, contemporary learning processes in American schools tend to focus on the individual and, too often, remove students from interpersonal contexts which support and provide meaning to learning (Tharp & Gallimore, 1988). Unlike learning in society at large, classroom instruction seldom involves sufficient group efforts to achieve understanding or to solve problems (Resnick, 1987b; Tharp & Gallimore, 1988).

In practice, providing for social construction of knowledge means moving from strictly whole-class instruction, sometimes followed by individual seatwork, to a greater reliance on interactive, small-group activities. The use of small-group activities has both theoretical and practical advantages to student learning. Theoretically, pair and small-group collaboration can sharply increase the rate of social dialogue and improve the quality of assisted performance by teachers and peers (Englert et al., 1991; Rosenshine & Meister, 1992; Tharp & Gallimore, 1991). During small-group activities, the learner can benefit from peers who model complex cognitive processes, and from classmates at different levels of understanding. Youngsters can observe that learning is transitional, not a static, all-or-nothing phenomenon (Collins, Brown & Holum, 1991; Schroeder & Lester, 1989). Practically, small-group activities can help eliminate students' requests for immediate help with challenging tasks. Students working in small-groups create opportunities for the teacher to listen to and observe students' thinking, and to make interventions when appropriate (Good, Reys, Grouws & Mulryan, 1989-90; Wood, Cobb & Yackel, 1991).

Collaborative peer editing or peer response groups is another strategy based on the understanding that writing involves an interaction between readers and writers in a literate community (Englert et al., 1991; Freedman, 1987; Rosenshine & Meister, 1992;

Sealey, 1986). Peer editing groups — usually organized in pairs or small groups of three or four students — confer during class time at various stages of the writing process, e.g., pre-writing, drafting, revising, editing, and publishing (Sealey, 1986), and provide opportunities for students to dialogue about the content, form, and creation of their text (Barrett, 1989; Beyer, 1992; Englert et al., 1991). Asking advice and peer feedback, especially at the initial stages of writing (Olson, 1990), helps students develop a sense of audience beyond that of the teacher-examiner, and an awareness of how revision through collaboration extends and elaborates one's ideas (Barrett, 1989; Brown, 1989; Brown & Campione, 1986).

Peer and cross-age tutoring are additional strategies by which students share not only the "answer," but the processes used to reach a problem solution. Peer tutoring consists of one student teaching others on a one-to-one basis, or one tutor working with two or three students simultaneously. Those tutored generally benefit because they identify more easily with peer models than with adult authority figures, and they receive more immediate feedback or clarification of information (Ashley, Jones, Zahniser & Inks, 1986). As a result of their efforts, peer tutors learn through the act of teaching: they reinforce their own knowledge and skills, and gain in social maturity which, in turn, builds their self-confidence, sense of responsibility, and self-esteem (Ashley et al., 1986; Jenkins & Jenkins, 1987; Reisman, 1988).

The emergence of "real" conversation about academic matters is an important feature of the cooperative learning approach to instruction (Davidson & Worsham, 1992). In cooperative learning, heterogeneous groups of four or five students work "together to maximize their own and each other's learning" (Johnson & Johnson, 1991, p. 298). However, simply organizing students in groups and telling them to work cooperatively does not promote higher achievement and higher-level reasoning. Slavin (1983, 1991) suggests that group goals, often in the form of group rewards or recognition, and individual accountability must be present for cooperative learning tasks

to promote academic learning. Furthermore, interactions within groups must have certain qualities — helping, ensuring all do a fair share, giving constructive feedback, challenging other's reasoning without engaging in personal criticism, sharing resources, keeping an open mind, and promoting safety so that all members feel free to share their thoughts (Johnson & Johnson, 1989; Presseisen, 1992). Thus, to promote cognitive change, teachers must facilitate cooperation in learning as well as attend to instructional concern for curriculum, task, and student self-development.

Assessment in the Restructured Classroom Environment

Just as our understanding of how children develop and learn challenges our curriculum and teaching practices, it forces us to reexamine how we assess student learning, as well. Conventional tests of educational progress are designed to quantify indirectly, in a single setting, whether or not the student possesses or recalls factual knowledge or discrete skills, irrespective of the context. Students work individually within a specified time frame to select the one "right" or "best" answer for each test item. These traditional tests are based on the empiricist approach to cognitive development, which first views learning as sequential and linear, and then sees complex learning as composed of smaller prerequisite elements (Shepard, 1991). Resnick and Resnick (1992) use the terms "decomposability" and "decontextualization" to refer to the underlying assumptions of such a theory, where higher-order skills occur only after component skills are independently mastered. Shepard (1991) further describes the relationship between assessment and instruction as a "teach-test-teach" mode in which, at each learning juncture, tests are used for the purpose of measuring specific behavioral outcomes of instruction.

The limitations of conventional testing are frequently cited in school reform literature (Linn, Baker & Dunbar, 1991). Chief among them is that paper-and-pencil tests are proxies rather than examples of the actual performances we want students to master (Wiggins, 1989a). Moreover, evidence suggests that standardized achievement

tests foster segregating students by ability, lower expectations for some students, lead to student disengagement in learning and thinking, and neglect the application of learning in the real world (Paris, Lawton & Turner, 1992). Further, these tests provide little diagnostic information on the quality of student understanding (Fleming & Chambers, 1983). Conventional testing can also negatively impact instruction, when teachers focus on limited content and simplistic format (Brown, 1989; Nolen, Haladyna & Haas, 1990). As a result, these tests are not only poorly serving students, teachers, and parents, but their validity is diminished (Frederiksen & Collins, 1989). Test scores themselves become meaningless, a concept which Messick (1984) refers to as "test score pollution."

If the primary goal of the restructured classroom environment is to foster **authentic** student achievement — the demonstrated performance of an accomplished mind — then the assessment goal is to develop high quality measures of this valued achievement. The alternative or direct assessments being proposed are performance-based measures that require students to demonstrate specific performances or abilities that are valued as educational outcomes (Archbald & Newmann, 1988). Emphasis is placed on students demonstrating thoughtfulness, making judgments, applying new understandings, and making connections in a variety of ways. Moreover, these alternative assessments are referred to as authentic when performance is assessed in "real," life-relevant rather than contrived, conditions (Newmann, 1991). Although basic skills and knowledge are obviously important to a thinking person, in the new assessments the mere reproduction of subject matter is not valued as authentic achievement. Rather, thinking is considered an on-going process, not something concluded after the acquisition of facts (Shepard, 1991). Examples of these "rediscovered modes of assessment" (Wolf, Bixbey, Glenn & Gardner, 1991) include portfolios of work products and performance-based tasks, such as extended projects and presentations, and what Sizer (1992) refers to as "exhibitions" which thoughtfully demonstrate accumulated knowledge.

The alignment and integration of curriculum, instruction, and assessment are critical in the restructured classroom environment. But how should this alignment come about and what is the appropriate role for assessment? To some, assessment can be a vehicle to redirect instruction toward the conscious pursuit of authentic achievement (Shephard, 1991; Wiggins, 1989a). When assessment shapes instruction, "teaching to the test" is an educationally effective strategy (Resnick & Resnick, 1992). It allows student and teacher to focus on higher-order, cognitive functioning and other valued standards of performance. It provides a bridge for students to understand the bases of instruction from a perspective of assessing their own performance, a major metacognitive and self-regulating goal (Garcia & Montes, 1992). To others, assessment and instruction need to be well integrated and dynamic (Feuerstein, 1980), and, in Vygotskian terms, allow for continual movement between the two processes and constant regrouping to reach goals. For example, Feuerstein (1979) and others look at a child in the process of learning to determine his/her potential for change. Such an assessment of cognitive potential reflects two types of measures, an existing level of competence, and a measure of "responsivity to instruction" (Short, Cuddy, Friebert & Schatschneider, 1990) which provides qualitative information regarding cognitive change. However, regardless of the proposed degree of integration of assessment and instruction, there is general agreement that the static results and outcome-orientation of traditional tests provide insufficient measures of competence or ability, particularly for low-achieving or at-risk students, where **qualitative** information concerning processing strategies is critical.

Will a teacher's use of alternative or performance-based assessments facilitate a better learning environment for students at-risk? The following discussion describes how use of such assessments can, when combined with meaningful classroom activities and carefully selected curricula, transform the classroom to allow the eight essential elements of a restructured classroom environment to operate and support learning and development. The discussion is organized in two sections: first, the major rules which

guide assessment in a restructured classroom environment are described; and second, the role changes required of teachers in developing and implementing these rules are presented.

Rules guiding assessment in a restructured classroom. Educational restructuring, as with any genuine reform effort, implies altering existing rules to facilitate adaptation to major change. A central theme of the current reform movement is that these alterations will achieve "a different order of results" (Corbett, 1990). How should progress toward these newly-defined outcomes of high performance be measured? There are at least three basic rules, or principles, which must guide the development and implementation of authentic classroom assessment. These rules concern the development of standards, the construction of knowledge, and the role of collaboration in fostering autonomy.

Central to authentic assessments in the restructured classroom environment is the development of a set of standards of excellence for **all** students; that is, clear, explicit definitions of the particular performances and understandings that must be mastered by all students as outcomes of instruction (Wiggins, 1992). Such standards include tangible goal statements for both the academic content areas and the higher-level cognitive operations. Implied here is a view of thinking as a type of performance to be sampled and assessed, just as in auditions, athletic competitions, and driving tests (Wiggins, 1989b). Thinking as a performance shares a number of characteristics with other performances, including a balance of humility or quality and risk, a non-linear developmental progression over time, and interpretation of information and beliefs (Wolf et al., 1991).

High expectations for all students is based on the premise that intelligence is not a fixed trait — all children have the ability to learn at their own rate and style. Also, with this paradigm, the goal of schooling is to maximize each individual student's achievement and mastery of standards. Evidence suggests the negative effects of ability grouping and other special placements for lower-achieving students (Oakes, 1992;

Slavin, 1987). Providing these students with a watered-down curriculum denies them the opportunity to master complex performance and reinforces their placements through the provision of boring, static tasks. Having high expectations for all students implies teachers need not assess student readiness to participate in a thoughtful task by assessing whether they possess the independent skills involved in task performance. In a restructured classroom, the preferred approach is to have all children focus on the task, thus permitting students who need to develop specific skills to see their relevance, in context, and providing all students an opportunity to engage in understanding and thinking. Moreover, providing all students with high quality assessment tasks communicates a shared understanding of high expectations. In this way, assessment provides an opportunity for students to learn valuable skills, rather than to merely produce "right" answers.

Related to this view of intelligence is a new understanding of cognitive development. This understanding reflects a change from an early Piagetian view of cognitive development, that is, the development of basic processes which apply to all contexts, to a view of development as gradual advances in skills and domain-specific knowledge (Rogoff, 1990). The implication here for assessment, as well as for curriculum and instruction, is that children will display different abilities and skills depending on the specific purpose and context of the task (Beyer & Nodine, 1985; Fischer, 1980; Siegler, 1989). Rogoff (1990) emphasizes the significance of microgenetic development when she includes in her definition of development "transformations in thinking that occur with successive attempts to handle a problem, even in time spans of minutes" (p. 11). Authentic assessment recognizes the significance of context and task demands by proposing tasks that are longitudinal, that involve students and teachers working together, and that allow students to use resources, such as books and calculators. In short, these are tasks that model serious adult work and reflect the mediational quality of the classroom.

Recently, based on the dynamic view of intelligence, a number of clinical programs have been developed which have implications for classroom instruction and student assessment (Budoff, 1987; Feuerstein, 1980). Although educators have known for some time that children who do not spontaneously exhibit certain abilities may, in fact, respond with cues, suggestions, or prompts (e.g., Flavell, 1976; Freeman, 1980), it is only recently that researchers have begun to examine the educational implications of these findings (Lidz, 1987). In contrast to the traditional diagnostic use of tests to determine a child's "readiness," or instructional level, the **Learning Potential Assessment Device** (Feuerstein, 1979), for example, assesses the child's performance by identifying a range of skills, as in the ZPD, bound at one end by an existing level of competence and at the other end by a **potential**, developmental level. This potential level can be reached by gradually developing learner responsibility through mediation, metacognition, and self-regulating activities, as described in mediational pedagogical strategies (Brown & Campione, 1986; Brown & Ferrera, 1985; Campione, Brown, Ferrara & Bryant, 1984). In the restructured classroom, assessment becomes a central dimension of cognitive transfer with both curriculum and instruction.

Unlike conventional assessments, alternative assessments inform students and involve them in meaningful discussion about what is valued and intended. This in itself can be a learning process for both students and teachers. Some even go so far as to define a goal of assessment to be to "promote intense discussion of standards and evidence among all of the parties who are affected" (Wolf et al., 1991, p. 59). Exemplars of levels of performance that set the standards must also be communicated to students, so it is clear as to how their performance is to be judged; students can monitor their own performance (Wiggins, 1989a). The dramatic change is from conventional testing, where students are passive and the teacher has all the answers, to empowering students to actively "assess their own performance reliably and thus develop clear goals to strive for in their learning" (Frederiksen & Collins, 1989, p.30). Ultimately, such assessments

foster student autonomy and self-regulation. Rather than just receiving a score on a test, students can measure their own achievement against a standard of excellence.

Assessment, then, is a means for monitoring a student's performance in comparison to some agreed-upon standards. The purpose is not to compare or rank students based on some quantitative score (e.g., Wiggins' "gatekeeping"), by requiring students to provide answers from which it is impossible to determine underlying strategies, but rather to provide the student and teacher with qualitative information, over time and across situations, about student cognitive functioning. This does not mean that quantitative information, such as the use of grammatical rules in producing a composition, are irrelevant. It does mean, however, that what is valued is the application of basic information in authentic ways to facilitate the development and enhance the quality of student thinking. If high standards and expectations are not developed, and student performance in relation to these standards monitored and assessed over time, many students, particularly those at risk, will not be challenged to become self-regulated learners.

The second and third rules guiding assessment in the restructured classroom environment follow from what we know about the nature of knowledge and understanding. First, that teachers need to provide all students with experiences that require the active construction of knowledge; the goal is for students to demonstrate their thinking and learning **potential** by actually "doing" (as opposed to transmitting or acquiring) science, for example. This doing, according to Greeno (1989), is the student's elaboration and reorganization of his/her knowledge and understanding. Implied here is the significance of context, which is known to profoundly influence children's cognitive functioning (Bronfenbrenner, 1991; Ceci, Ramey & Ramey, 1990) and test performance. Interestingly, although research focusing on the use of such assessment practices in the classroom is scarce (Nickerson, 1989; Stiggins, 1985, 1991), and more general issues of quality remain unaddressed (Linn, Baker & Dunbar, 1991), subjective

reports of their powerful motivating and engaging qualities are abundant in educational literature and the current popular press (Mezzacappa, 1992b; Wiggins, 1992). Further, it appears that new, inviting assessment activities can be powerful and meaningful learning experiences for both students and teachers (Wolf, LeMahieu & Eresh, 1992).

Viewing knowledge as socially-constructed gives rise to the third rule guiding assessment in the restructured classroom environment, which is that teachers in such a classroom must construct social environments for both learning and assessment. This follows from the new understanding of the social nature of cognition. Thinking, according to Vygotsky (1978), is an activity which is dependent on speech and which is developed and maintained through interpersonal experience. In terms of classroom assessment, this interpersonal experience is two-fold: first, it stresses the importance of the teacher-student relationship to provide experience necessary for advancing skills and understanding. Teachers need to guide students to internalize their "tools" for thinking and thus transform to higher levels of competence (Brown & Ferrara, 1985). The second interpersonal context of assessment refers to collaboration and interaction among peers and others. Included here are group projects and presentations which provide occasions for modeling thinking strategies and scaffolding complex performances in order to share and learn from others (Resnick & Klopfer, 1989). In addition, there are ways for presenting assessment tasks to individual and groups of students, parents, school staff, and community members.

Alternative assessment and teacher role changes. What is required of teachers in developing and implementing the rules guiding assessment in the restructured classroom environment? Are teachers well prepared for and receptive of this new evaluative role? The answers to these questions involve building an environment that supports at least three types of teacher change. First, teachers need a new belief system based on the current research, referenced throughout this chapter, on cognitive development and how students learn. Understanding this new paradigm

means providing **all** students with equal opportunities to use new information, through meaningful problem-solving situations, to achieve meaningful goals; it means understanding that there are many ways to solve problems rather than one simple, correct solution; it means being sensitive to each student's context and mindful that "the way we tend to construct our world is only one construction among many" (Brown & Langer, 1990, p. 332). It also means understanding the range of strategies that students may use to solve particular problems and the circumstances and advantages of each (Siegler, 1989). For example, does a particular solution to a mathematical problem reflect a mechanical computation or a conceptual understanding? Also critical is that teachers develop an open and collaborative atmosphere where beliefs such as reconceptualized understandings about learning and testing, along with goals and standards, are clearly communicated to students. Obviously, what and how a teacher chooses to assess learning in the classroom sends important messages to students (Wolf, et al., 1992).

A second understanding required of teachers concerns the purpose and characteristics of "good" classroom assessments. Assessments in the restructured classroom are designed to directly inform both teacher and student on the skills and understandings of the individual student. Thus, they support both teachers in their instructional planning and students in the development of their cognitive capacity. As authentic measures, they have value beyond evaluation, and are relevant, foster disciplined inquiry, and require the integration of knowledge (Archbald & Newmann, 1988). To develop these assessments means, after establishing standards, that teachers must identify a range of performance levels within these standards to monitor and facilitate student progress. If teachers do not select good tasks and measures and establish criteria for what to value, the reliability and validity of these new assessments will be in serious doubt. Teachers must also be open to students having a more active and responsive role in classroom assessment, through participating in the development

of tasks and standards, through self-and peer-evaluation, and through collaborative work with others.

Third, teachers need practical knowledge and experience in designing and scoring these new measures and in using the findings. In order to determine initially what they want students to know and be able to do at the end of the academic year, teachers need a new understanding of "literacy" within their content areas of expertise, the fluidity of knowledge, and connections among disciplines, as opposed to the traditional use of text-as-curriculum (Brown, 1991b; Eisner, 1982). Teachers need opportunities to develop, use, and score the three basic types of assessments — paper-and-pencil assessments (e.g., teacher and text tests, quizzes, homework), performance assessments (e.g., observations of student behaviors, judgments of student products), and direct personal communication with students (e.g., student interviews and conversations, teacher intuitions and feelings about students) (Stiggins, 1991). Teachers must learn to be cautious in developing and using these new measures. Before jumping on the portfolio "bandwagon," they need to understand that a portfolio is more than just a file crammed full of student products. Rather, a portfolio is a purposeful collection of student work with criteria established for both selecting and judging the merit of the pieces included (Camp, 1990). It is a metacognitive tool of learning. Finally, teachers need support and encouragement in the development and use of these new measures.

Following from this new belief system is the proposition that knowledge about how students learn must similarly guide a teacher's curricular, instructional, and assessment practices. Thus, the teacher's challenge is to adopt a mindful, flexible perspective (Brown & Langer, 1990) — to create appropriate, meaningful apprenticeship experiences for students — by modeling tasks, scaffolding or supporting the student, coaching through the student's entire learning process (Collins, Brown & Holum, 1991), and being a "reflective practitioner" (Zessoules & Gardner, 1991). What needs to be addressed is much more than just "assessment literacy." Although currently this

knowledge seems to be available to only a select group of educational researchers and scholars (Stiggins, 1991), it is the implications that a coordinated effort has for all school decision-making that is so important for the restructured classroom. Indeed, it is these interrelationships of curriculum, instruction, and assessment which ought to be the center of teacher education in general, as well as the focus of preparation of all those involved in changing schools. These interrelationships should also be the bases of conversations and collaboration within grade levels, school buildings, districts, and even states. Without the support of school values and regulations in the context of these interrelationships, the new vision of learning and assessment in the restructured classroom environment is not likely to be fulfilled. It must be pointed out once again that it is in the classroom itself — Pauly's (1991) crucible of education — where the new paradigm for schooling in the 2lst century begins.

Implications for At-Risk Students

Designing the restructured classroom environment for all students assumes the essential elements are functional for students at risk of school failure as well as those for whom success seems relatively assured. In fact, the movement to radically transform American education calls for a redefinition of education in this country and "normed thinking" — where students are seen as either successes or failures — is no longer a viable option (Jones & Pierce, 1992).

But what does a restructured learning environment seek to accomplish in terms of the cognitive capacity of youngsters who have historically been poorly served by schooling, and who are "locked-in" to educational communities in crisis? There appear to be at least four major implications of restructured schooling for students at risk. These include: (1) the need for inclusion in the classroom and the larger school community; (2) the emphasis on the development of student potential; (3) the focus on thinking as key to intelligent performance; and (4) the search for more explicit

intercultural relationships. These implications are herein discussed relative to the eight essential elements.

Need for Inclusion in the School Community

At-risk youngsters have all too often been viewed as learners outside the regular classroom. Often forged into groups labeled by handicap or deficit, these students rarely escape such categorical treatment and generally fail to see the higher-order thinking they so badly need. Although tracking students is a complex and dynamic process, research shows that after more than seventy years of study, homogeneous sorting in elementary schools fails to foster the desired achievement outcomes (Oakes, 1992). In terms of social placement, Oakes proposes, negative effects result from the influences of tracking, especially for African-American and Latino youngsters who are disproportionately represented in low-track academic classes.

The restructured classroom needs to be a user-friendly workplace in which all students are warmly welcomed to full-right membership and feel they are significant contributors to the learning exchange (Jones & Hixson, 1991). Cushman (1992) calls for heterogeneous grouping in secondary schools, too, modeling the larger, democratic society and challenging educators to initiate de-tracking procedures. Alternative grouping, special projects and apprenticeships, and cooperative learning assignments are only a handful of the activities that teachers can design on a continuous progress path to challenge differing student abilities and to stretch each learner's mental accomplishments. While more collaborative work is called for among teachers to create these growth opportunities, the expectation of success makes the additional effort worthwhile.

Inclusion in the regular educational community enables at-risk students to join in the exchange of academic problem resolution. Sometimes the give-and-take is with a "wiser" adult; sometimes it is with classmates. What is underlined in such instructional conversations, so important to every learner's development — and even more so to

youngsters with limited experience — are the differing means by which the teacher can both appreciate and intervene in a student's thought processing (e.g., modeling, feeding back, contingency managing, directing, questioning, explaining, task structuring) (Ballenger, 1992; Tharp & Gallimore, 1991). By contrast, to be sorted out, to be given a watered-down curriculum, and to be expected to perform according to less stringent standards are aspects of built-in-failure. For America's at-risk students, this is not legitimate membership in a learning community.

Inclusion needs to be extended to at-risk students' lives beyond school. Parents and caregivers, potential mentors and assisters in the community, all need to be apprised of the at-risk student's higher-level experience in learning. As these students begin to formulate real meanings concerning their work in classrooms, they can share these meanings with friends, family, and others. While there may be tensions between academic experience and the actual lives of urban youngsters, such tensions need to be surfaced and dealt with to insure valid instructional success (Palincsar, 1992).

Emphasis on the Development of Student Potential

The developmental nature of the learner, which underlies many of the essential elements, is primarily a dynamic view of learning. At-risk students need to be viewed the same as their more able peers. They should not be measured for **how much** of a given ability they possess, but seen as potentially moving along a similar sequence of thought development — only at a differing **rate** (Elkind, 1989). Kaniel and Feuerstein (1989) call for students with learning difficulties to become candidates for "cognitive modifiability," conscious educational efforts to change their ways of thinking, to challenge them with new learning, to be creative, to build their own innovative conceptions of reality.

For at-risk students to share in the restructured learning environment, their circumstances and diverse cultural backgrounds need to be carefully considered and appreciated by the classroom instructor (Means, Chelemer & Knapp, 1991; Moll, 1992).

Moreover, such characteristics do not mean that these students formulate fundamental knowledge in ways inferior to other learners; Gardner's (1983) multiple intelligences are equally attainable across culture and sub-cultures (Elkind, 1989). What is apparently different is their inability to focus on understanding and its generalizability (Pogrow, 1992). Paris & Winograd (1990) maintain that a heightened appreciation of metacognition is what is called for in the instruction of at-risk students. They propose that metacognition helps these students in at least three ways: to understand their own thinking and learning, to become aware of and to begin to deal with "bugs" or difficulties in a particular problem solution, and to relate to instructional situations with better comprehension and more positive affect. Thus, these researchers see potential for both cognitive and conative change in students whose learning once was considered marginal.

The message of student modifiability needs to be carried beyond the classroom and school, as well. Strategic learning that is concomitant with metacognitive behavior must be recognized in the larger community in which at-risk students reside (Jones & Pierce, 1992). Feuerstein (1990) calls this the need to mediate for an optimistic alternative. Other researchers see the possibility that through such transfer student resilience can be enhanced (Benard, 1991). Ultimately, to carry the learning of the restructured classroom to the real world experienced by at-risk students means to see their lives, their problems, and the constraints they face on a daily basis in a different perspective.

Focus on Thinking as Key to Intelligent Performance

The restructured classroom casts cognitive development as central to teaching and learning, and key to the assessment of performance. Such expectations should be no different for at-risk learners. Some researchers see these relationships as closely aligned with principles for creating powerful apprenticeship opportunities in the classroom: content, method, sequencing, and sociology (Collins, Hawkins & Carver, 1991). Content

must aim for student expertise development; method focuses on ways to develop that expertise, sequencing prepares orderly advancement to better and more complex performance; and sociology demands positive situations which can interrelate the individual with the group. But the most telling aspect of such learning for at-risk students lies in their ability to **internalize** the cognitive aspects of instruction, to **self-regulate**, build on personal strengths, and become spontaneous thinkers. By contrast, this is exactly what Kaniel and Feuerstein (1989) suggest is the missing ingredient of the outmoded "passive-acceptance approach" to teaching students with learning difficulties. Without restructured education, these youngsters are kept busy with minimal, rote tasks and alienated from serious, cognitive learning.

Self-regulation as an authentic educational goal is particularly important for long-range development of low-achieving and disadvantaged students (Au, 1980; Brown & Ferrara, 1985). Unfortunately, this goal is ignored in some of the major educational platforms set for America's schools. Uphoff (1991) notes the national misreading of the concept of "readiness" in early childhood, highlighting the current expectation that it is the child who must bend to meet the institution. Is that authentic? Where in the national program are the evaluation strategies that facilitate the gradual development of metacognitive abilities, including self-regulation, in children who may not be members of the mainstream population nor fluently speak standard English?

Assessments are available to diagnose at-risk students' learning potential and to identify their appropriate levels of instruction, but they are rarely found in actual practice. Consider the "think aloud technique" used in studies of problem-solving strategies (Newall & Simon, 1972), in diagnosing learning disabilities (Short et al., 1990), and in remediating problem-solving deficiencies (Bereiter & Bird, 1985). Few are the schools that are aware of dynamic assessment programs, such as those developed by Feuerstein (1979) and others (Lidz, 1987). A similar testing strategy has been noted as highly successful in the reciprocal teaching approach (Palincsar & Brown, 1984), but rare

are the school systems in which such implementations are being conducted and researched (Campione, 1992). In terms of innovative evaluation of at-risk learners in the current reform period, unless assessment policies and procedures are adjusted to match new curricula and instructional goals in the classroom, Oakes' negative conclusion on tracking is likely to be repeated.

Search for More Explicit Intercultural Relationships

The need for education to respect the learner and the learning process are important implications of the restructured classroom's influence on at-risk populations. Good teachers are rare. Those instructors who hold the belief that poor and minority youngsters have little knowledge to contribute to a classroom's dialogue should not be teachers at all (Brown & Langer, 1990; Jones & Hixson, 1991). Considering the cultural diversity evident in America's changing demographics, the demand for effective teachers who can relate to students of many backgrounds and varied personal histories will only increase in the coming decade (Moll, 1990; Vobejda, 1992). These are the instructors with the positive belief systems called for in restructured classrooms.

A salient finding of the cognitive revolution is the acknowledgement that to understand how something works, it is necessary to experience it directly (Goldenberg & Gallimore, 1991). Such experience creates local knowledge-building: it is that which is proximal in the ZPD (Goldenberg, 1991). Feuerstein (1990) maintains it is teachers who can mediate the various needs youngsters bring to the classroom who really engage students in their learning space. Mediated learning, then, must be an objective with regard to intercultural relationships in the classroom of current America (Presseisen & Kozulin, 1992). Teachers need to maximize such mediation for all students, but especially for those who are not members of the mainstream culture. Tharp (1989) proposes that such instruction delivers the significant, universalistic teaching/learning strategies that are embedded in the foundation of current educational reform: "varied activity settings, language development activities, varied sensory modalities in

instruction, responsive instructional conversations, increased cooperative and group responsive instructional conversations, increased cooperative and group activities, and a respectful and accommodating sensitivity to students' knowledge, experience, values, and tastes" (p. 356). In contrast to majority students, if these students do not have the opportunity for such learning at school, it very well may never occur.

Fundamental to education in a restructured classroom, then, is the opportunity to examine simultaneously one's own culture and that of one's neighbors, as well. With the new literacies of the cognitive revolution, every at-risk student's curriculum must seek intercultural exchanges, reflected in every subject area, and constantly revised with use (Hiebert, 1991). Constructing new meanings at school, in cooperation with teachers and classmates, will enable autonomous learners to brave the vexing problems they face beyond the school's confines.

In Conclusion

The overall goal of this chapter has been to address the problem of creating a learning environment for all students that makes possible the achievement of restructured purpose in American education. In terms of the three questions that guided this examination (see pp. 11-12), what has been learned and what still needs to be pursued?

Restructured Schooling and the Cognitive Paradigm

Perhaps the clearest finding of this study is the importance of cognition to the restructuring goals of the current reform effort. Whether conscious or not, the major redesign of American education hinges on making real the higher-order processes involved in the development of competent students. This factor emphasizes that the thinking required for work and study in the world today is neither simplistic nor easy. Educators need to understand the complexity of developing minds; they need to review and know the research of nearly a century of theorizing and experimentation. They

need to become active learners themselves in applying the principles of cognition to the practice of education.

Cognitive matters relate to the global marketplace as well as to the nation's schools. Teaching for thinking or inquiry should not be glibly presented as a "silver bullet" for American policy makers (Eisner, 1992). Rather, the country needs to understand that success in both education and work, ultimately, is characterized by the ability to analyze and manipulate symbolic images — words, numbers, visual representations — in dynamic problem solving (Reich, 1991). Schools need to ask themselves what this type of performance requires of the learning process, not just when exit examinations are given but throughout a student's academic career from early childhood to graduation. As Tharp and Gallimore (1989) apply their research, the issue is not only one of "rousing minds to life," but rousing entire schools, as well, and connecting these institutions to the larger community and workplace.

An emphasis on cognition is not to focus on logic or reasoning as the sole definition of thinking, but to see the broader dimensions of a new, interdisciplinary science. Conation and metacognition, creativity as well as critical analysis, are called for in education's new understandings of the development of multiple thinking abilities. The importance of teacher education is underscored here, as well as the need to re-evaluate how schooling defines "intelligences" and how it assesses the existence and performance of intelligent behaviors (Gardner, 1990). Further, the integration of curriculum, instruction, and assessment calls for a serious re-organization of traditional teacher roles (Cuban, 1992; Schlechty & Cole, 1991).

At-Risk Students and Thinking

We believe that developing the thinking ability of all students is a challenge to be confronted. For too long, American schools have not advanced the cognitive development of students considered "at-risk" of failure and dropping out. Considering the recent census report on dropout rates (Mezzacappa, 1992b), the need to include these

populations in a restructured approach to education is critical and immediate. Unfortunately, to date, it has not been an issue energetically addressed in either local or national political platforms.

The eight essential elements of a restructured classroom environment which form the basis of this study must underlie the learning experience of all students, while recognizing and respecting differences in background, ability, and perspective of each learner. Some of these differences reflect developmental concerns; educators must work on what is appropriate for the experience of each youngster to spark learning and understanding. Some reflect individual circumstances; educators must be cognizant of the diverse personal backgrounds of students, more varied now than classrooms have been since the beginning of this century. While other differences reflect group dimensions, educators must analyze the particular circumstances of populations isolated by history and cultural experience. Today, the importance of fulfilling all of the essential elements may be one way of seeking a kind of "standard" for student learning in an era when standardization does not so readily fit reality (Eisner, 1992).

To bring about the integration of curriculum, instruction, and assessment within the restructured classroom environment is not an easy task. For at-risk students, the question of appropriate tools for learning is matched by the need to understand the workings of a student's ZPD. Exploring the potential role of technology as a "tool" may also facilitate learning for these students. While some researchers reviewed in this study stress the primary importance of human interaction and mediation (Feuerstein, 1990; Kozulin, 1990), there are others who maintain that a parallel use of computers and electronic media can enhance learners' understanding and elaborate on meaningful classroom contexts (Collins, 1991; Polin, 1991; Salomon, Perkins & Globerson, 1991; Scott, Cole & Engel, 1992). These applications need to be researched further and their effects carefully documented. Also, impact on cognition depends on how technology is used by teachers and students (Shavelson & Salomon, 1985). It should not be forgotten

that the most important aspect of restructuring American education is to bring at-risk students into a meaningful exchange of ideas as full members of a learning community (Thurow, 1991). The role of higher thought development versus remediation in efforts such as Chapter I programming is a particular case in point that deserves serious examination (Jones & Pierce, 1992; Lewis, 1992).

Diversity and Learning

The social context of learning is a condition that has been shown to be unique in the formation of reflective thought (Hiebert, 1991; Moll, 1992). The dynamism of a restructured classroom environment rests on the liveliness of classroom dialogue and the teacher's ability to create innovative curricular experiences, tied to cognitive development, which students can share and extend. An important aspect of restructured education yet to be examined is the balance between the purview of the individual and the collective vision required by knowledge in a particular domain. Experiments in current curriculum development and alternative assessment techniques have begun, yet they need to be monitored and assessed. It must not be forgotten that the goal of the current reform effort is to give every generation and every student a chance to become mindful.

Finally, the role of constructivism in the restructured classroom environment suggests that every student builds knowledge and understanding in his/her own way. The single "uniformity" to be pursued, within the cultural pluralism evidenced in America's classrooms today, is the need for each learner to become self-regulatively inventive and, simultaneously, able to analyze carefully. As Piaget (1964) suggested nearly three decades ago:

> The accent must be on auto-regulation, on active assimilation — the accent must be on the activity of the subject. Failing this there is no possible didactic or pedagogy which significantly transforms the subject. (p. i)

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In short, there is no substitute for thinking something through on your own. In the current reform era, providing all students an environment in which this can happen is the essence of radical change in America's schools.

NOTE

1. Various published descriptions of restructured learning environments were reviewed in conjunction with determining the model of the eight essential elements. In particular, **The Nine Common Principles of Essential Schools** of the Coalition of Essential Schools (Coalition of Essential Schools, 1991) and the **Learner-Centered Psychological Principles: Guidelines for School Redesign and Reform** (APA Task Force, 1992) were drawn upon for this study.

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